

## **Sterile Dosage Forms**

Parenteral preparations are those pharmaceutical products that are given by other than oral routes. Transfusion fluids and injections are parenteral preparations. Injections are the sterile solutions or suspension of drugs in aqueous or oily vehicle meant for introduction into the body by means of injectable needle under or through one or more layers of the skin or mucous membrane.

## **Advantages of Parenteral preparation:**

- Onset of action is quick.
- The drug action can be prolonged by modifying the formulation.
- The drugs which cannot be administered by oral route, can be administered by this route.
- Transfusion fluids containing nutritive like glucose and electrolytes such as sodium chloride can be given by this route.
- The patients who are vomiting or unconscious can not take drug by oral route .In such cases drug can be administered by this route.

## **Disadvantages of Parenteral preparation:**

- Injection causes pain at the site of injection.
- It is difficult to save a patient when overdose is given.
- The trained persons are required to administer the drugs.
- The administration of the drugs through wrong route of injection may prove to be fatal.
- There are chances of sensitivity reaction or allergic reaction of a drug by an individual. These reactions of a drug by an individual. These reactions are sometimes very fatal.

# Routes of administration of a Parenteral products

The various routes of a administration of Parenteral preparation are as follows:

- **Intradermal (intracutaneous) Injections** : These are given in between dermis and epidermis. Skin of the left forearm is usually selected for giving the injections. Generally, 0.1 to 0.2 of Parenteral solutions is injected by this route.
- **Hypodermis (Subcutaneous) injections**: This injections are given into the muscular tissues. The muscle of the shoulder, buttock and thigh is to be selected. Generally volume up to 2.0 ml is administrated by this route.
- **Intravenous Injections**: This injections are made into the vein and hence directly introduced in the blood stream. The median basilic vein near the anterior surface of the elbow is usually selected, because it is easily located and connects to the arm. Large volume of Parenteral solution ranging from 1ml to 500ml or more than can be injected .

- **Intra-arterial injections:** These are similar to intravenous injections and occasionally used for an immediate effect in a peripheral area.
- **Intracardiac Injections:** These are given into the heart muscle or ventricle in an emergency only; for example, as a stimulant following cardiac arrest.
- **Intrathecal Injections:** These are made into subarchnoid space that surrounds the spinal cord. This route is used for giving spinal anaesthesia.
- **Intracisternal injection:** These are given in between the first and second cervical vertebrae. This route is used to withdraw C.S.F. for diagnostic purpose.
- **Peridural injection:** These are given between the duramater and inner aspects of vertebra.
- **Intra-articular injection:** These injections are given into the liquid that lubricates articulating ends of bones in joints.
- **Intracerebral injections;** These injections are given into cerebrum.

# Types of Parenteral injection

## **1.Solutions or emulsion of medicament suitable for injection:**

These are commonly called as injections. The parenteral preparation in this form may be supplied in single dose containers or multiple dose container. Its volume varies from 0.5ml to a litre . e.g.atropine sulphate injection.

**2.sterile solids:** Drugs which are not stable in solution are prepared and supplied as dry sterile solid which are dissolved in suitable solvent immediately before its administration . e.g.benzyl penicillin G sodium injection.

**3.Sterile suspension:** These are the sterile suspension of drug in suitable solvent which are administered by intramuscular route. e.g. sterile hydrocortisone acetate suspension, and sterile chloramphenicol suspension.

**4.Transfusion fluid:** These are parenteral solution which are administered by intravenous route. They are generally used for nutrition and to maintain electrolyte balance e.g. ringer solution, dextrose injection, sodium chloride injection.

# General requirements for Parenteral dosage forms

- Stability:
- Sterility:
- Free from pyrogens:
- Free from foreign particles:
- Isotonicity:
- Specific gravity:
- Chemical purity:

# FORMULATION OF PARENTERAL PREPARATIONS

- **VEHICLE**
- **ADJUVANTS**
- **SOLUBLISING AGENTS**
- **STABILIZERS**
- **BUFFERING AGENTS**
- **ANTIBACTERIAL AGENT**
- **CHELATING AGENT**
- **SUSPENDING, EMULSIFYING & WETTING AGENTS**
- **TONICITY FACTORS**